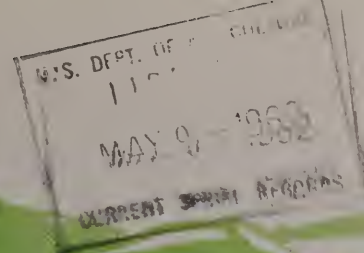


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RANGE IMPROVEMENT

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NOTES

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(AGRI.-OGDEN)

STATEMENT OF PURPOSE

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This publication is printed primarily to inform professional range administrators of important range improvement and management developments and findings. These "Notes" may include extracts of published papers, unpublished preliminary reports of research work, unpublished reports on administrative studies, and personal observations or suggestions of other range administrators. No claim is made as to the accuracy or completeness of studies or conclusions drawn.

All who read these RANGE IMPROVEMENT NOTES are encouraged to submit material for publication, or suggestions for improving its usefulness. Full credit will be given for any material used.

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USE OF A MECHANICAL STEEL POST DRIVER

(By Jesse A. Palm, District Forest Ranger, Toiyabe National Forest, Nevada)

During the fall of 1958, seven miles of fence were constructed for part of the sheep Creek revegetation project. The fence is four-stranded, barbed wire, supported by steel and wooden posts. From four to nine steel posts, spaced 16 feet apart, depending on the terrain and anticipated strains, were used between the wooden posts. In the seven miles of fence, 1,837 steel posts were used.

To place the steel posts, a mechanical post driver was used. This post driver is manufactured by the Danuser Machine Company of Fulton, Missouri.

The Danuser post driver can be tractor, truck or trailer mounted. On the West Walker Ranger District a trailer-mounted post driver was used. It was powered by a Briggs and Stratton single-cylinder, four-cycle, air-cooled, 2-1/2 horsepower gasoline engine. The cost of the post driver and trailer, less tires, delivered to the Wellington Ranger Station, was \$485.20.

A three-man crew was used to place the posts, operate the post driver, and drive the truck pulling the trailer. About six days' labor by the crew were required to drive about 1,800 steel posts. In a few places the steel posts had to be hand driven because the truck could not position the trailer and driver.

Through much of the area where the fence was built, there was rocky ground and a shallow soil underlaid by a dense hardpan. Such obstacles to hand-driven steel posts were no hindrance to the mechanical post driver.

On one eight-hour day the three-man crew placed 416 steel posts with the mechanical post driver. The time for driving a steel post with the driver varied from five seconds on easy ground to two minutes plus on exceptionally difficult areas. Driving on the hard areas would bend the steel posts unless short strokes were delivered by the driver.

There were no breakdowns in the machinery. Maintenance and operation are simple. A careful reading and following of the manufacturer's instructions are all that are needed to use the steel post driver.

As with other machinery it is possible for the operators, or other persons, to be hurt by this machine. The three-man crew using the steel post driver had never seen one until it arrived on the job. Instructions and a rehearsal of the operating procedure took about 30 minutes. Some six days and 1,800 steel posts later not a man had been hurt and the machine was in first-class operating condition.

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Of the many advantages of farm life for boys, one of the greatest is the gaining of real knowledge of animals as fellow mortals, learning to respect them and to love them, and even to win some of their love. Thus, godlike sympathy grows and thrives and spreads far beyond the teachings of churches and schools, where too often the mean, blinding, loveless doctrine is taught that animals have neither mind nor soul, have no rights that we are bound to respect, and were made only for man, to be petted, spoiled, slaughtered, or enslaved.

-- John Muir



The Danuser post driver mounted on a trailer.



Finished product. Crew ready to move to next post position.

NITROGEN FERTILIZER ON RANGE AREAS SHOWS EXCELLENT BENMORE RESULTS

(By C. Wayne Cook and L. A. Stoddart, Utah State
Agricultural Experiment Station)

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During the fall of 1957, nitrogen fertilizer (ammonium nitrate) was applied to seeded wheatgrass pastures at Benmore, Tooele County, at the rate of 20 pounds and 40 pounds of available nitrogen per acre. The seeded grasses used were crested and pubescent wheatgrass.

In the spring of 1958, grass yield from ungrazed plots was weighed in each of the several fertilized areas as well as in unfertilized areas. The harvested material was analyzed chemically to determine the effect of fertilization upon nutrient content. The pastures were then grazed by cattle. At the end of the grazing season, July 30, degree of utilization was determined on both fertilized and untreated plots.

In spite of the unusually dry spring and summer of 1958, areas fertilized with 20 pounds of nitrogen produced 1,150 pounds of herbage per acre, which was 206 pounds more than unfertilized areas. Plots treated with 40 pounds of nitrogen produced 1,340 pounds of herbage per acre, which was 396 pounds more than check plots.

Application of fertilizer had a pronounced effect upon utilization. Forage growing on plots where 20 pounds of nitrogen per acre was applied was more readily eaten than unfertilized forage. Forage on plots fertilized with 40 pounds of nitrogen was considerably more palatable than forage on plots fertilized with only 20 pounds. Average utilization on untreated plots was about 35 percent, compared to 48 percent on plots fertilized with 20 pounds of nitrogen and 65 percent on plots treated with 40 pounds of nitrogen.

Fertilized plots produced more protein and total digestible nutrients than unfertilized plots. Untreated plots produced only 81 pounds of protein per acre; whereas plots treated with 20 pounds of nitrogen produced 125 pounds of protein per acre, and plots treated with 40 pounds produced 140 pounds of protein per acre.

Similar differences were evident in total digestible nutrients from fertilized and unfertilized plots.

From this preliminary study it is indicated that yield, palatability, and nutrient content of wheatgrasses may be substantially increased by the application of even small quantities of nitrogen fertilizer.

Because of the pronounced increase in palatability on fertilized plots compared to unfertilized plots, it is believed that better distribution of livestock can be obtained by periodically fertilizing areas distant from areas of normal concentration. This would tend to draw the animals into areas that otherwise might not be fully used and to decrease the tendency of animals to concentrate grazing around water and in easily reached valley bottoms.

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The steering wheel of an automobile is not conducive to dreams, either great or small.

-- Ernest Swift

Excerpts from EFFECT OF 2,4-D ON ABUNDANCE
AND FOODS OF POCKET GOPHERS

(By James O. Keith, Richard M. Hansen, and A. Lorin Ward
Rocky Mtn. Forest and Range Experiment Station, Forest
Service, U. S. Department of Agriculture, Fort Collins,
Colorado; Colorado Agric. Experiment Station, Colorado
State University, Fort Collins; and Bureau of Sport Fisheries
and Wildlife, Fish and Wildlife Service, U. S. Dept. of the
Interior, Denver, Colorado, respectively)

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Sound management of rangelands in the western United States may not be fully realized until the influences of small rodents are more clearly understood. This is particularly true in mountainous areas where pocket gophers (Thomomys talpoides) are numerous. Although several studies have been designed to investigate the effect of pocket gophers on rangeland, the net influence of gopher activity is not yet clear. Currently, there are two broad viewpoints, each supported to a degree by research findings. One contends that pocket gophers have little effect on rangeland, since removal of the animals from experimental plots resulted in no significant improvement in the plant cover. The other, widely held by ranchers and land administrators, is that gophers are a detriment to rangeland and its improvement and should be controlled.

The possibility that spraying rangeland with 2,4-D might reduce pocket gopher populations was noted by Cummings (1948) and Kalmbach (1950) when inspecting experimental plots sprayed by the Forest Service in western Colorado. They observed that gopher mounds

were less abundant on sprayed plots than on adjacent untreated areas. The present study, as a followup on their observations, was designed to provide more conclusive evidence of the effect of spraying with 2, 4-D on gopher populations and gopher food habits.

Study Area

Grand Mesa, in west-central Colorado, was selected for study because large areas of weedy rangeland with dense populations of gophers were being sprayed with 2, 4-D by the Forest Service. Grand Mesa has an average elevation of 10,300 feet and an average annual precipitation of about 30 in., most of which falls as snow. The shallow, fertile soils are of volcanic origin. Pocket gophers are abundant only in non-forested areas.

Rangelands on Grand Mesa are generally in fair to poor condition. Herbage production averages 700 lb. (air dry) per acre of which about 530 lb. are produced by forbs. Grass and sedge production averages about 170 lb. per acre.

In an attempt to improve the condition of these rangelands, the Forest Service sprayed about 2,000 acres with 2, 4-D between July 6 and July 19, 1956. The herbicide was applied by airplane at the rate of 3 lb. acid equivalent per acre in a butyl-ester formulation with a diesel oil carrier. Other areas to the west and east were sprayed in 1955 and 1957, respectively.

Prior to spraying in 1956, ten study plots, 200 ft. square, were established to evaluate the effect of the herbicide on vegetation, gopher populations, and gopher food habits. Five plots, designated as spray plots, were located in the area to be sprayed, and five others, designated as control plots, were in an area that would not be treated.

Pocket Gopher Populations

To provide an index to the relative abundance of pocket gophers in 1956, Macabee traps were set along the 800-foot periphery of each study plot. Traps were left for a 48-hour period and checked twice daily. The number of gophers trapped during that period was used as an index to the population on each area.

In 1957 this procedure was repeated, using approximately the same trap lines. Exploratory work prior to this study showed that complete removal of gophers from larger areas had little or no effect on population numbers the following year.

The total number of pocket gophers trapped on control plots increased from 101 in 1956 to 110 in 1957. In comparison, 117 animals were taken from the spray plots before treatment in 1956, but only 15 were captured in 1957. This represents a reduction of 87 percent. Analyses show no significant differences between numbers of gophers trapped from the control areas in 1956 and 1957, or between the numbers taken from the spray plots before treatment in 1956 and those from the control areas either year.

Effect of Herbicide on Vegetation and Ground Cover

Analyses of herbage production data for 1956 and 1957 show a significant reduction in perennial forbs and an increase in grasses on the sprayed plots but no real change on control plots. Production of perennial forbs on sprayed plots declined from 396 lb. per acre in 1956 to 67 lb. in 1957, a reduction of 83 percent. Grasses, on the other hand, produced 74 lb. (37 percent) more herbage per acre one year after spraying.

Spraying also greatly altered the composition of plant cover. In 1956, forbs accounted for 67 percent of the total herbage produced, while in 1957 they comprised only 30 percent. Common dandelion was drastically reduced, but Letterman needlegrass increased in production after spraying.

Transect records show that changes in plant cover were essentially the same as those for production. On sprayed areas the percentage of forbs in the cover was greatly reduced, while percentage of grasses increased.

Food Habits of Pocket Gophers

Food habits were determined by analyzing stomach contents of gophers trapped during the course of the study.

Pocket gopher stomachs were frozen until examined in the laboratory. Freezing kept the contents in a more natural state and thus facilitated identification of food particles.

Slides and microphotographs showing tissues of plants common on Grand Mesa were used in identification of plant materials. Samples of individual plant species that had been fed to caged gophers were also recovered and used for reference.

Stomach analyses revealed drastic changes in the food habits of pocket gophers as a result of spraying. Whereas 82 percent of their diet consisted of forbs before spraying in 1956, they ate nearly equal amounts of grass and forbs on the same areas one year later. On control plots in 1957, their diet was essentially the same as that on sprayed plots in 1956 before treatment. On areas that were sprayed both in 1956 and 1957, and where few living forbs remained, their diet was only 9 percent forbs and 91 percent grass in October 1957.

The rapidity with which gopher food habits changed is indicated by the diet of animals captured in October from the area sprayed in July 1957. These gophers were eating 26 percent forbs and 74 percent grass, compared with 64 percent forbs and 36 percent grass on a nearby control area.

The proportion of plant material taken by gophers from above and below ground was not affected by spraying.

Discussion

The reasons for the decline in pocket gopher numbers on herbicide-treated areas are not known. Movement of gophers to

untreated areas seems unlikely because of the large acreages involved. Therefore, reductions were probably due either to mortality, a decrease in breeding, or to both of these factors. These may have been caused by depletion of essential food supplies or by direct or indirect toxicity of the herbicide.

Most of the plants that pocket gophers seem to prefer were drastically reduced by the spray treatment. Production of dandelion was reduced 91 percent; agoseris, 99 percent; western yarrow 85 percent; and Rydberg penstemon, 88 percent. It is possible, therefore, that reduction in these and other food items may have been responsible for the sharp decline in gopher populations on areas treated with 2, 4-D.

To determine whether 2, 4-D might have a direct toxic effect, Halvorson (1956) offered oat groats treated with a solution of 0.5 percent active 2, 4-D to five caged gophers for 5 days. These animals showed no signs of being affected by the 2, 4-D in their diet. Although 4 of the 5 preferred untreated food, 2 of them consumed more than 4 gm. of the treated oat groats each day.

Some studies have shown that rabbits, chickens, and livestock are not affected by eating forage sprayed with 2, 4-D

(Rudd and Genelly, *ibid.* ; Mitchell, Hodgson, and Gaetjens, 1946; Grigsby and Farwell, 1950). On the other hand, Stahler and Whitehead (1950) cite instances where cattle became ill and died after eating certain weeds treated with 2,4-D. They found that beet leaves treated with 2,4-D contained toxic quantities of potassium nitrate. A similar study by Berg and McElroy (1953) showed that spraying at a rate of 2 to 8 equivalent oz. of 2,4-D per acre resulted in a moderate increase in the nitrate content of several weeds. Fertig (1952) found that the peak accumulation of nitrate appears to fall on the second or third day after treatment and recommended caution in spraying where livestock were grazing. While nitrate poisoning might be the answer, it is not possible, on the basis of present knowledge, to conclude that pocket gophers were poisoned by this agent.

Summary

Aerial spraying of weedy, mountain rangeland in western Colorado with 2,4-D resulted in the following changes one year after treatment:

1. Pocket gopher populations were reduced 87 percent.
2. Production of perennial forbs was reduced 83 percent and grass production increased 37 percent.
3. The diet of pocket gophers changed from 82 percent forbs to 50 percent forbs, and from 18 percent grass to 50 percent grass.

Untreated control areas showed no significant change in gopher numbers or herbage production from one year to the next. Gopher food habits did not change on untreated areas. About two-thirds of the gophers' diet during summer months consisted of above-ground plant material. The most common food items identified in pocket gopher stomachs were dandelion, western yarrow, and Rydberg penstemon. Although the reasons for the decline in gopher numbers on sprayed areas are not known, depletion of essential food items and nitrate poisoning are the most likely explanations.

(Jour. of Wildlife Management,
Vol. 23, No. 2, April 1959)

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Boys who have been blistering their hands with a shovel, axe, or grub hoe all day, have little need for a counselor or a psychiatrist.

-- Ernest Swift

